

CLAIMS

What is claimed is:

- 1 1. A linear table, comprising:
2 a base with an essentially flat lateral mounting surface;
3 a slide plate also with an essentially flat lateral mounting surface, the slide plate
4 being mounted to the base such that the mounting surface of the base is in opposed
5 relation to the mounting surface of the slide plate; and
6 a pair of bearing assemblies interposed between the base and slide plate, with
7 each bearing assembly including a pair of bearing ways and a rolling element between the
8 bearing ways, with one bearing way from each bearing assembly fixedly secured to the
9 mounting surface of the base, and the other bearing way of each bearing assembly fixedly
10 secured to the mounting surface of the slide plate, the bearing ways and rolling element
11 of each bearing assembly being under predetermined lateral preload and accurately
12 aligned on the linear table without integral locating and preload means in the linear table.

- 1 2. The linear table as in claim 1, wherein each bearing way is supported only against
2 the respective flat lateral mounting surface of the base or slide plate.

- 1 3. The linear table as in claim 1, wherein the base and slide plate each include short
2 locating ribs projecting outwardly from the flat surfaces of the base and plate,
3 respectively, the ribs having a flat surface, and the bearing ways each having a
4 corresponding flat surface located against the flat surface of the ribs, the ribs spacing the
5 bearing ways from the opposed surface of the respective base or slide plate.

1 4. The linear table as in claim 1, wherein each bearing way comprises an elongated,
2 essentially square or rectangular component in cross-section, with a rolling element
3 groove in one side surface of the bearing way, and a flat mounting surface on an adjacent
4 side of the bearing way.

1 5. The linear table as in claim 4, wherein each bearing way further includes another,
2 flat side surface opposite from the one side surface.

1 6. The linear table as in claim 1, wherein the integral locating and preload means
2 comprises at least one of i) integral bearing locating shoulders; and ii) integral preload
3 screws.

1 7. A method for assembling a linear table, comprising the steps of:
2 providing a slide plate, a base and a plurality of bearing assemblies between the
3 slide plate and base, wherein each of the bearing assemblies includes a pair of bearing
4 ways and a rolling element between the bearing ways;

5 loosely mounting one of the bearing ways of each bearing assembly to the slide
6 plate and the other of the bearing ways to the base;

7 locating a precision parallel device in engaging relation to one of the bearing
8 ways of each bearing assembly, the precision parallel device providing fixed reference
9 surfaces for the one bearing ways;

10 locating a preload fixture in engaging relation to the other of the bearing ways of
11 each bearing assembly, the preload fixture including a tool with members, at least one of
12 which is laterally moveable, and compressing the bearing ways of each bearing assembly
13 together between the tool members and the references surfaces of the precision parallel
14 device, until a predetermined lateral preload is applied across each bearing assembly; and

15 thereafter securely fixing the bearing ways of each bearing assembly to the base
16 and the slide plate with fasteners, such that the slide plate moves smoothly and precisely

17 in a linear direction relative to the base.

1 8. The method as in claim 7, wherein the step of compressing the bearing ways
2 comprises compressing the bearing ways of each bearing assembly between one of the
3 tool members and one of the reference surfaces.

1 9. The method as in claim 8, wherein the bearing assemblies each include an inner
2 bearing way and an outer bearing way, and the precision parallel device is located
3 between the inner bearing ways of the bearing assemblies, and the preload fixture is
4 located outwardly of the outer bearing ways of the bearing assemblies, and the tool of the
5 preload fixture includes a pair of jaws, where one of the jaws is inwardly movable toward
6 the other jaw to compress the bearing ways of each bearing assembly together against a
7 respective reference surface of the precision parallel device.

1 10. The method as in claim 8, wherein the bearing assemblies each include an inner
2 bearing way and an outer bearing way, and the precision parallel device is located
3 outwardly of the outer bearing ways of the bearing assemblies, and the preload fixture is
4 located between the inner bearing ways of the bearing assemblies, and the tool of the
5 preload fixture includes a pair of jaws, where one of the jaws is outwardly movable
6 toward the other jaw to compress the bearing ways together against a respective reference
7 surface of the precision parallel device.

1 11. The method as in claim 7, wherein the precision parallel device is located in
2 engagement with the one of the bearing ways of each bearing assembly prior to the
3 preload fixture being located in engagement with the other of the bearing ways of each
4 bearing assembly.

12. The method as in claim 7, wherein the precision parallel device is initially located against rib structure on the slide plate and/or base prior to the preload fixture compressing the bearing ways to locate the precision parallel device relative to the linear table.

13. A method for assembling a linear table, comprising the steps of:
providing a slide plate, a base and a plurality of bearing assemblies between the slide plate and base, wherein each of the bearing assemblies includes a pair of bearing ways and a rolling element located between the bearing ways;
loosely mounting one of the bearing ways of each bearing assembly to one of the slide plate or the base;
locating a precision parallel device in engaging relation to the one bearing way of each bearing assembly, the precision parallel device providing fixed reference surfaces for the one bearing ways;
locating a preload fixture in engaging relation to the one bearing ways, the preload fixture including a tool with members, at least one of which is laterally moveable, the tool locating the one bearing way of each bearing assembly at a predetermined location with respect to the table;
securely fixing the one bearing way of each bearing assembly to the one of the base or slide plate,
thereafter loosely mounting another of the bearing ways of each bearing assembly to the other of the slide plate or the base;
locating the preload fixture in engaging relation to the other bearing ways, and laterally compressing the bearing ways of each bearing assembly together with the tool members, until a predetermined lateral preload is applied across each bearing assembly;
and
thereafter securely fixing the other bearing way of each bearing assembly to the other of the base or slide plate, such that the slide plate moves smoothly and precisely in a linear direction relative to the base.

1 14. The method as in claim 13, wherein the precision parallel device is located
2 between both of the one bearing ways of each bearing assembly, and the preload fixture
3 is located outwardly of both of the one bearing ways of each bearing assembly, and the
4 tool of the preload fixture includes a pair of jaws, where one of the jaws is inwardly
5 movable toward the other jaw to locate the one bearing ways against a respective
6 reference surface of the precision parallel device.

1 15. The method as in claim 13, wherein the precision parallel device is located
2 outwardly of both of the one bearing ways of each bearing assembly, and the preload
3 fixture is located between both of the one bearing ways of the bearing assemblies, and the
4 tool of the preload fixture includes a pair of jaws, where one of the jaws is outwardly
5 movable toward the other jaw to locate the one bearing ways against a respective
6 reference surface of the precision parallel device.

1 16. The method as in claim 13, wherein the precision parallel device is located in
2 engagement with the one bearing ways of each bearing assembly prior to the preload
3 fixture being located in engagement with the one bearing ways of each bearing assembly.

1 17. The method as in claim 13, wherein the precision parallel device is initially
2 located against rib structure on the slide plate and/or the base prior to the preload fixture
3 locating the one bearing ways to locate the precision parallel device relative to the linear
4 table.

1 18. The method as in claim 13, wherein the precision parallel device is initially
2 located against rib structure on the slide plate and/or the base prior to the preload fixture
3 compressing the other bearing ways to locate the precision parallel device relative to the
4 linear table.

- 1 19. A linear table, comprising:
2 a base with a planar mounting surface;
3 a slide plate also with a planar mounting surface, the slide plate being mounted to
4 the base such that the mounting surface of the base is in opposed relation to the mounting
5 surface of the slide plate; and
6 a pair of bearing assemblies interposed between the base and slide plate, with
7 each bearing assembly including a pair of bearing ways and a rolling element laterally
8 disposed between the bearing ways, with one bearing way from each bearing assembly
9 having a flat mounting surface located flush against the mounting surface of the base to
10 provide the only support between the base and one bearing way and being fixedly secured
11 to the base via fasteners extending through the base; and the other bearing way of each
12 bearing assembly also having a flat mounting surface located flush against the mounting
13 surface of the slide plate to provide the only support between the slide plate and the other
14 bearing way and being fixedly secured to the slide plate via fasteners extending through
15 the slide plate; the bearing ways and rolling element of each bearing assembly being
16 under predetermined lateral preload and accurately aligned on the linear table without
17 integral bearing locating shoulders and/or integral preload screws in the linear table.